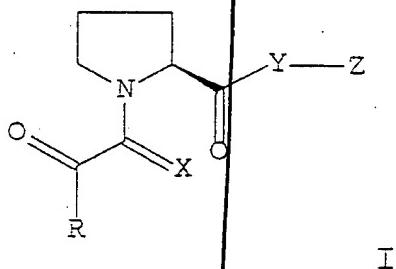


WHAT IS CLAIMED IS:

1. A method of revitalizing hair growth which comprises: administering to an animal an effective amount of a non-immunosuppressive pyrrolidine carboxylate compound.
- 5
2. The method of claim 1 wherein the pyrrolidine carboxylate is a compound of the formula:



wherein

(R) is selected from the group consisting of a C₁-C₆ straight or branched chain alkyl or alkenyl group optionally substituted with C₁-C₆ cycloalkyl, C₁ or C₅ cycloalkyl, C₅-C₆ cycloalkenyl, Ar₁, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C₁-C₄ alkyl, C₁-C₄ alkenyl, or hydroxy, where Ar₁ is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino.

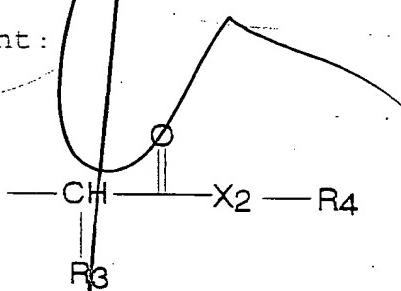
X is selected from the group consisting of oxygen, sulphur, methylene (CH_2), or H_2 ;

Y is selected from the group consisting of oxygen or NR_2 , where R_2 is hydrogen or $\text{C}^1\text{-C}_6$ alkyl; and

5 Z is selected from the group consisting of $\text{C}_2\text{-C}_5$ straight or branched chain alkyl or alkenyl,

wherein the alkyl chain is substituted in one or more positions with Ar_1 as defined above, $\text{C}_3\text{-C}_8$ cycloalkyl, cycloalkyl connected by a $\text{C}_1\text{-C}_6$ straight or unbranched alkyl or alkenyl

10 chain, and Ar_2 is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, $\text{C}_1\text{-C}_6$ straight or branched alkyl or alkenyl, $\text{C}_1\text{-C}_4$ alkoxy or $\text{C}_1\text{-C}_4$ alkenyloxy, phenoxy, benzyloxy, and amino; Z may also be the fragment:



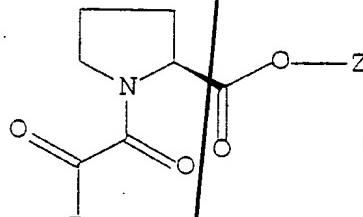
wherein

20 R_3 is a $\text{C}_1\text{-C}_6$ straight or branched alkyl $\text{C}_1\text{-C}_8$ optionally substituted with $\text{C}_3\text{-C}_8$ cycloalkyl, or Ar_1 as defined above, and unsubstituted Ar_1 ;

X₂ is O or NR_5 , where R_5 is selected from the group consisting of hydrogen, $\text{C}_1\text{-C}_6$ straight or branched alkyl and alkenyl;

R₄ is selected from the group consisting of phenyl, benzyl, C₁-C₆ straight or branched alkyl or alkenyl, and C₁-C₆ straight or branched alkyl or alkenyl substituted with phenyl; or pharmaceutically acceptable salts or hydrates thereof.

5 3. The method of claim 1 wherein the pyrrolidine carboxylate is a compound of the formula:



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wherein

R₁ is a C₁-C₆ straight or branched chain alkyl or alkenyl group optionally substituted with C₁-C₆ cycloalkyl, C₁ or C₆ cycloalkyl, C₅-C₆ cycloalkenyl, or Ar₁, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C₁-C₄ alkyl, C₁-C₄ alkenyl, or hydroxy, and where Ar₁ is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino;

Z is a C₂-C₆ straight or branched chain alkyl or alkenyl, wherein the alkyl chain is substituted in one or more positions with Ar₁ as defined above, C₃-C₈ cycloalkyl, cycloalkyl connected by a C₁-C₆ straight or unbranched alkyl or alkenyl chain, or Ar₂ where Ar₂ is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino; or pharmaceutically acceptable salts or hydrates thereof.

4. The method of claim 1 wherein the pyrrolidine carboxylate compound is selected from the group consisting of:

3-phenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

- 3-cyclohexyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 3-cyclohexyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 5 (1R)-1,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-furanyl])ethyl-2-pyrrolidinecarboxylate,
- 10 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thienyl])ethyl-2-pyrrolidinecarboxylate,
- 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thiazolyl])ethyl-2-pyrrolidinecarboxylate,
- 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-phenyl)ethyl-2-pyrrolidinecarboxylate,
- 3-(2,5-dimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 3-(2,5-dimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 20 2-(3,4,5-trimethoxyphenyl)-1-ethyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 3-(3-Pyridyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 3-(2-Pyridyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 25 3-(4-Pyridyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 3-phenyl-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

5 3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

10 3,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

15 3-(3-Pyridyl)-1-propyl (2S)-N-(2-thienyl)glyoxyl pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxobutyl)-2-pyrrolidinecarboxylate,

20 3,3-Diphenyl-1-propyl (2S)-1-cyclohexylglyoxyl-2-pyrrolidinecarboxylate,

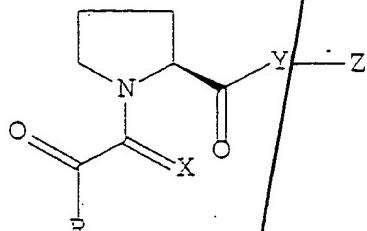
3,3-Diphenyl-1-propyl (2S)-1-(2-thienyl)glyoxyl-2-pyrrolidinecarboxylate, and pharmaceutically acceptable salts, hydrates, and mixtures thereof.

25 5. A method of promoting hair germination which comprises: administering to an animal an effective amount of a non-immunosuppressive pyrrolidine carboxylate compound.

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6. The method of claim 5 wherein the pyrrolidine carboxylate is a compound of the formula:



wherein

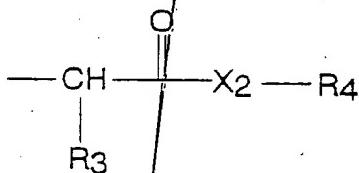
5 R₁ is selected from the group consisting of a C₁-C₆ straight or branched chain alkyl or alkenyl group optionally substituted with C₁-C₃ cycloalkyl, C₃ or C₅ cycloalkyl, C₅-C₇ cycloalkenyl, Ar₁, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C₁-C₄ alkyl, C₁-C₄ alkenyl, or hydroxy, where Ar₁ is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-, 3-, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino:

15 X is selected from the group consisting of oxygen, sulfur, methylene (CH₂), or H₂,

20 Y is selected from the group consisting of oxygen or NR₂, where R₂ is hydrogen or C₁-C₆ alkyl; and

Z is selected from the group consisting of C₂-C₆ straight

or branched chain alkyl or alkenyl,
wherein the alkyl chain is substituted in one or more
positions with Ar₁ as defined above, C₃-C₈ cycloalkyl, cycloalkyl
connected by a C₁-C₆ straight or unbranched alkyl or alkenyl
chain, and Ar₂ is selected from the group consisting of 2-
indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-
thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one
to three substituents which are independently selected from the
group consisting of hydrogen, halo, hydroxyl, nitro,
trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-
C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino; Z
may also be the fragment:



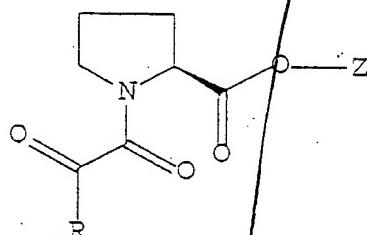
wherein

R₃ is a C₁-C₉ straight or branched alkyl #₁-C₉ optionally substituted with C₃-C₈ cycloalkyl, or Ar₁ as defined above, and unsubstituted Ar₁;

X₂ is O or NR₅, where R₅ is selected from the group consisting of hydrogen, C₁-C₆ straight or branched alkyl and alkenyl;

R₄ is selected from the group consisting of phenyl, benzyl, C₁-C₅ straight or branched alkyl or alkenyl, and C₁-C₆ straight or branched alkyl or alkenyl substituted with phenyl; or pharmaceutically acceptable salts or hydrates thereof.

7. -- The method of claim 5 wherein the pyrrolidine
carboxylate is a compound of the formula:



wherein

5 R₁ is a C₁-C₆ straight or branched chain alkyl or alkenyl group optionally substituted with C₃-C₆ cycloalkyl, C₅ or C₆ cycloalkyl, C₅-C₆ cycloalkenyl, or Ar₁, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C₁-C₄ alkyl, C₁-C₄ alkenyl, or hydroxy, and where Ar₁ is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino;

15

Z is a C₂-C₆ straight or branched chain alkyl or alkenyl, wherein the alkyl chain is substituted in one or more positions with Ar₁ as defined above, C₃-C₆ cycloalkyl, cycloalkyl connected by a C₁-C₆ straight or unbranched alkyl or alkenyl chain, (or Ar₂ where Ar₂ is selected

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from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino; or pharmaceutically acceptable salts or hydrates thereof.

8. The method of claim 5 wherein the pyrrolidine carboxylate is selected from the group consisting of:

3-phenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

(1R)-1,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-

dioxopentyl)-2-pyrrolidinecarboxylate,
3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-furanyl])ethyl-2-pyrrolidinecarboxylate,
3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thienyl])ethyl-2-pyrrolidinecarboxylate,
3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thiazolyl])ethyl-2-pyrrolidinecarboxylate,
3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2,phenyl)ethyl-2-pyrrolidinecarboxylate,
3-(2,5-dimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
3-(2,5-dimethoxyphenyl)-1-prop-2-(E)-enyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
2-(3,4,5-trimethoxyphenyl)-1-ethyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
3-(3-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
3-(2-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
3-(4-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
3-phenyl-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,
3-phenyl-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,
3-phenyl-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,
3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-

dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

5 3,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

(1) 3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

Art 3-(3-Pyridyl)-1-propyl (2S)-N-([2-thienyl]glyoxyl) pyrrolidinecarboxylate,

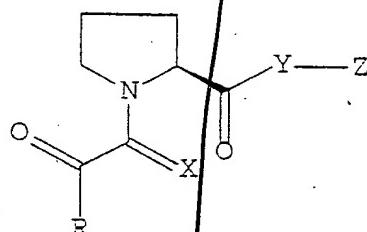
10 3,3-Diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxobutyl)-2-pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-cyclohexylglyoxyl-2-pyrrolidinecarboxylate,

15 3,3-Diphenyl-1-propyl (2S)-1-(2-thienyl)glyoxyl-2-pyrrolidinecarboxylate, and pharmaceutically acceptable salts, hydrates, or mixtures thereof.

9. A method of preventing hair loss which comprises: administering to an animal an effective amount of a non-immunosuppressive pyrrolidine carboxylate compound.

20 10. The method of claim 9 wherein the pyrrolidine carboxylate is a compound of the formula:



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wherein

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R₁ is selected from the group consisting of a C₁-C₆ straight or branched chain alkyl or alkenyl group optionally substituted with C₁-C₆ cycloalkyl, C₃ or C₅ cycloalkyl, C₅-C₆ cycloalkenyl, Ar₁, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C₁-C₄ alkyl, C₁-C₄ alkenyl, or hydroxy, where Ar₁ is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino:

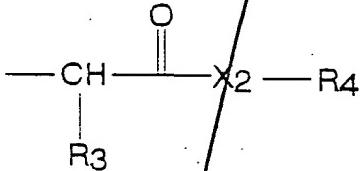
X is selected from the group consisting of oxygen, sulfur, methylene (CH₂) or H₂;

Y is selected from the group consisting of oxygen or NR₂, where R₂ is hydrogen or C₁-C₆ alkyl; and

Z is selected from the group consisting of C₂-C₆ straight or branched chain alkyl or alkenyl,

wherein the alkyl chain is substituted in one or more positions with Ar₁ as defined above, C₃-C₆ cycloalkyl, cycloalkyl connected by a C₁-C₆ straight or unbranched alkyl or alkenyl chain, and Ar₂ is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro,

trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino; Z may also be the fragment:



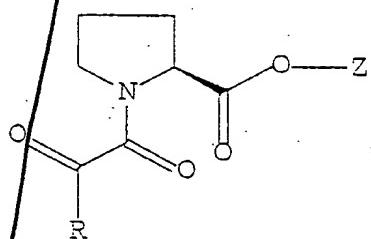
5 wherein

R₃ is a C₁-C₉ straight or branched alkyl, #₁-C₈, optionally substituted with C₁-C₆ cycloalkyl, or Ar₁ as defined above, and unsubstituted Ar₁;

X₂ is O or NR₅, where R₅ is selected from the group consisting of hydrogen, C₁-C₆ straight or branched alkyl, and alkenyl;

A2
R₄ is selected from the group consisting of phenyl, benzyl, C₁-C₆ straight or branched alkyl or alkenyl, and C₁-C₆ straight or branched alkyl or alkenyl substituted with phenyl, or pharmaceutically acceptable salts or hydrates thereof.

Claim 11. The method of claim 9 wherein the pyrrolidine carboxylate is a compound of the formula:



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20 wherein

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5 R_1 is a C_1 - C_6 straight or branched chain alkyl or alkenyl group optionally substituted with C_3 - C_6 cycloalkyl, C_1 or C_6 cycloalkyl, C_5 - C_6 cycloalkenyl, or Ar_1 , where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C_1 - C_4 alkyl, C_1 - C_4 alkenyl, or hydroxy, and where Ar_1 is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C_1 - C_6 straight or branched alkyl or alkenyl, C_1 - C_4 alkoxy or C_1 - C_4 alkenyloxy, phenoxy, benzyloxy, and amino;

10 20 Z is a C_2 - C_6 straight or branched chain alkyl or alkenyl, wherein the alkyl chain is substituted in one or more positions with Ar_1 as defined above, C_3 - C_6 cycloalkyl, cycloalkyl connected by a C_1 - C_6 straight or unbranched alkyl or alkenyl chain, or Ar_2 , where Ar_2 is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro trifluoromethyl, C_1 - C_6 straight or branched alkyl or alkenyl, C_1 - C_4 alkoxy or C_1 - C_4 alkenyloxy, phenoxy, benzyloxy, and amino; or pharmaceutically acceptable salts or hydrates thereof.

12. The method of claim 9 wherein the pyrrolidine carboxylate is selected from the group consisting of:

3-phenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

5 3-phenyl-1-prop-2-(E)-enyl (2S)-1-(3,3,-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

10 3-(3,4,5-trimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-propyl(2S)-1-(3,3,dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

15 3-cyclohexyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

20 (1R)-1,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-furanyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thienyl])entyl-2-pyrrolidinecarboxylate,

25 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thiazolyl])ethyl-2-pyrrolidinecarboxylate;

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2,phenyl)ethyl-2-pyrrolidinecarboxylate,

3-(2,5-dimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2,5-dimethoxyphenyl)-1-prop-2-(E)-enyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

5 2-(3,4,5-trimethoxyphenyl)-1-ethyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

10 3-(2-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

15 3-phenyl-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

20 3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

25 3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-N-([2-thienyl]glyoxyl)pyrrolidinecarboxylate,

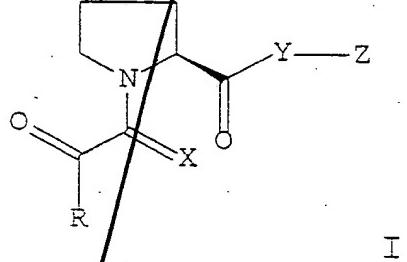
3,3-Diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxobutyl)-2-pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-cyclohexylglyoxyl-2-pyrrolidinecarboxylate,

5 3,3-Diphenyl-1-propyl (2S)-1-(2-thienyl)glyoxyl-2-pyrrolidinecarboxylate, or pharmaceutically acceptable salts, hydrates, and mixtures thereof.

Super Ovals / 13. A method of treating alopecia which comprises: administering to an animal an effective amount of a non-
10 immunosuppressive pyrrolidine carboxylate compound.

BP 14. The method of claim 13 wherein the pyrrolidine carboxylate is a compound of the formula:



wherein

15 R_1 is selected from the group consisting of a C_1-C_9 straight or branched chain alkyl or alkenyl group optionally substituted with C_1-C_9 cycloalkyl, C_3 or C_5 cycloalkyl, C_5-C_9 cycloalkenyl, Ar_1 , where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C_1-C_4 alkyl, C_1-C_4 alkenyl, or hydroxy, where Ar_1 is selected from
20 the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl.

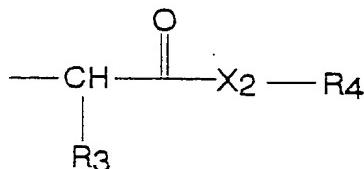
having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino:

X is selected from the group consisting of oxygen, sulphur, methylene (CH₂), or H₂;

Y is selected from the group consisting of oxygen or NR₂, where R₂ is hydrogen or C₁-C₆ alkyl; and

Z is selected from the group consisting of C₂-C₆ straight or branched chain alkyl or alkenyl,

wherein the alkyl chain is substituted in one or more positions with Ar₁ as defined above, C₃-C₈ cycloalkyl, cycloalkyl connected by a C₁-C₆ straight or unbranched alkyl or alkenyl chain, and Ar₂ is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino; Z may also be the fragment:



wherein

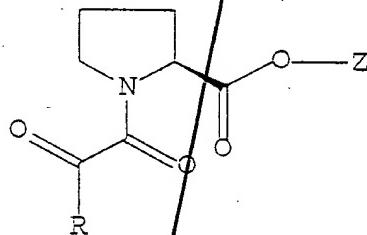
R₃ is a C₁-C₆ straight or branched alkyl #₁-C₈

optionally substituted with C_1-C_6 cycloalkyl, or
Ar₁, as defined above, and unsubstituted Ar₁;

X₂ is O or NR₅, where R₅ is selected from the group
consisting of hydrogen, C_1-C_6 straight or branched
alkyl and alkenyl;

R₄ is selected from the group consisting of phenyl,
benzyl, C_1-C_6 straight or branched alkyl or alkenyl,
and C_1-C_6 straight or branched alkyl or alkenyl
substituted with phenyl; or pharmaceutically
acceptable salts or hydrates thereof.

AB
Chair //
15. The method of claim 13 wherein the pyrrolidine
carboxylate is a compound of the formula:



II

wherein

15 R₁ is a C_1-C_6 straight or branched chain alkyl or alkenyl
group optionally substituted with C_3-C_6 cycloalkyl, C₃
or C₆ cycloalkyl, C_5-C_6 cycloalkenyl, or Ar₁, where said
alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may
be optionally substituted with C_1-C_4 alkyl, C_1-C_4
alkenyl, or hydroxy, and where Ar₁ is selected from the
20 group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl,
3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl,
3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl,

having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino;

Z is a C₂-C₆ straight or branched chain alkyl or alkenyl, wherein the alkyl chain is substituted in one or more positions with Ar₁ as defined above, C₁-C₈ cycloalkyl, cycloalkyl connected by a C₁-C₆ straight or unbranched alkyl or alkenyl chain, or Ar₂, where Ar₂ is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino; or pharmaceutically acceptable salts or hydrates thereof.

16. The method of claim 13 wherein the pyrrolidine carboxylate compound is selected from the group consisting of:

3-phenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-

dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-

5 dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

10 (1R)-1,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-furanyl])ethyl-2-pyrrolidinecarboxylate,

15 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thienyl])enyl-2-pyrrolidinecarboxylate

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thiazolyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2,phenyl)ethyl-2-pyrrolidinecarboxylate,

20 3-(2,5-dimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2,5-dimethoxyphenyl)-1-prop-2-(E)-enyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

25 3-(3,4,5-trimethoxyphenyl)-1-ethyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-

pyrrolidinecarboxylate,

3-(4-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

5 3-phenyl-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

10 3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

15 3,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-N-([2-thienyl]glyoxyl)pyrrolidinecarboxylate,

20 3,3-Diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxobutyl)-2-pyrrolidinecarboxylate,

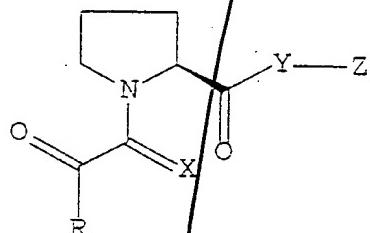
3,3-Diphenyl-1-propyl (2S)-1-cyclohexylglyoxyl-2-pyrrolidinecarboxylate,

25 3,3-Diphenyl-1-propyl (2S)-1-(2-thienyl)glyoxyl-2-pyrrolidinecarboxylate, and pharmaceutically acceptable salts, hydrates, and mixtures thereof.

17. A method of treating hair loss which comprises: administering to an animal an effective amount of a non-

immunosuppressive pyrrolidine carboxylate compound.

18. The method of claim 17 wherein the pyrrolidine carboxylate is a compound of the formula:



I

5 wherein

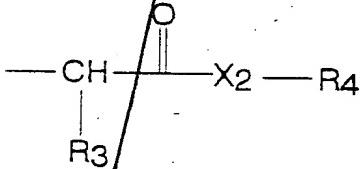
R₁ is selected from the group consisting of a C₁-C₆ straight or branched chain alkyl or alkenyl group optionally substituted with C₃-C₈ cycloalkyl, C₃ or C₅ cycloalkyl, C₅-C₇ cycloalkenyl, Ar₁, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C₁-C₄ alkyl, C₁-C₄ alkenyl, or hydroxy, where Ar₁ is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino:

20 X is selected from the group consisting of oxygen, sulphur, methylene (CH₂), or H₂;

Y is selected from the group consisting of oxygen or NR₂, where R₂ is hydrogen or C₁-C₆ alkyl; and

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Z is selected from the group consisting of C₂-C₆ straight or branched chain alkyl or alkenyl,
wherein the alkyl chain is substituted in one or more positions with Ar₁ as defined above, C₃-C₈ cycloalkyl, cycloalkyl connected by a C₁-C₆ straight or unbranched alkyl or alkenyl chain, and Ar₂ is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino; Z may also be the fragment:



wherein

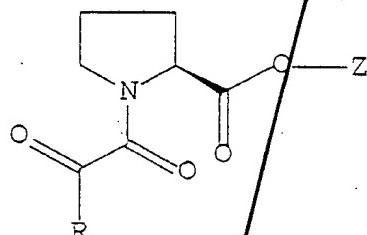
R₃ is a C₁-C₆ straight or branched alkyl optionally substituted with C₃-C₈ cycloalkyl, or Ar₁ as defined above, and unsubstituted Ar₁,

X₂ is O or NR₅, where R₅ is selected from the group consisting of hydrogen, C₁-C₆ straight or branched alkyl and alkenyl;

R₄ is selected from the group consisting of phenyl, benzyl, C₁-C₆ straight or branched alkyl or alkenyl, and C₁-C₆ straight or branched alkyl or alkenyl substituted with phenyl; or pharmaceutically

acceptable salts or hydrates thereof.

Claim 4
19. The method of claim 17 wherein the pyrrolidine carboxylate is a compound of the formula:



II

Claim 5
wherein

R₁ is a C₁-C₆ straight or branched chain alkyl or alkenyl group optionally substituted with C₁-C₆ cycloalkyl, C₃ or C₅ cycloalkyl, C₅-C₆ cycloalkenyl, or Ar₁, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C₁-C₄ alkyl, C₁-C₄ alkenyl, or hydroxy, and where Ar₁ is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino;

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Z is a C₂-C₆ straight or branched chain alkyl or alkenyl, wherein the alkyl chain is substituted in one or more positions with Ar₁ as defined above, C₁-C₆ cycloalkyl, cycloalkyl connected by a C₁-C₆ straight or unbranched

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alkyl or alkenyl chain, or Ar₂, where Ar₂ is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino; or pharmaceutically acceptable salts or hydrates thereof.

- 10
20. The method of claim 17 wherein the pyrrolidine carboxylate compound is selected from the group consisting of:
- 3-phenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 3-phenyl-1-prop-2-(E)-enyl (2S)-1-(3,3,-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 3-(3,4,5-trimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 3-(3,4,5-trimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 3-(4,5-methylenedioxyphenyl)-1-propyl(2S)-1-(3,3,dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 3-(4,5-methylenedioxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 25 3-cyclohexyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,
- 3-cyclohexyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

(1R)-1,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-furanyl])ethyl-2-pyrrolidinecarboxylate,

5 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thienyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thiazolyl])ethyl-2-pyrrolidinecarboxylate,

10 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2,phenyl)ethyl-2-pyrrolidinecarboxylate,

3-(2,5-dimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

15 3-(2,5-dimethoxyphenyl)-1-prop-2-(E)-enyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

20 2-(3,4,5-trimethoxyphenyl)-1-ethyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

25 3-(2-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

25 3-phenyl-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3 - (3 - Pyridyl) - 1 - propyl (2S) - 1 - (2 - cyclohexylethyl - 1, 2 - dioxoethyl) - 2 - pyrrolidinecarboxylate,

3 - (3 - Pyridyl) - 1 - propyl (2S) - 1 - (2 - tert - butyl - 1, 2 - dioxoethyl) - 2 - pyrrolidinecarboxylate,

5 3, 3 - diphenyl - 1 - propyl (2S) - 1 - (3, 3 - dimethyl - 1, 2 - dioxopentyl) - 2 - pyrrolidinecarboxylate,

3 - (3 - Pyridyl) - 1 - propyl (2S) - 1 - (2 - cyclohexyl - 1, 2 - dioxoethyl) - 2 - pyrrolidinecarboxylate,

10 3 - (3 - Pyridyl) - 1 - propyl (2S) - N - ([2 - thienyl]glyoxyl) pyrrolidinecarboxylate,

3, 3 - Diphenyl - 1 - propyl (2S) - 1 - (3, 3 - dimethyl - 1, 2 - dioxobutyl) - 2 - pyrrolidinecarboxylate,

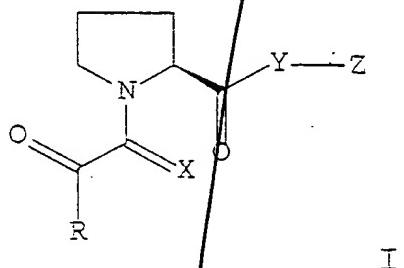
3, 3 - Diphenyl - 1 - propyl (2S) - 1 - cyclohexylglyoxyl - 2 - pyrrolidinecarboxylate,

15 3, 3 - Diphenyl - 1 - propyl (2S) - 1 - (2 - thienyl)glyoxyl - 2 - pyrrolidinecarboxylate, and pharmaceutically acceptable salts, hydrates, and mixtures thereof.

21. A method of treating hair loss associated with cancer therapy, wherein the cancer therapy is selected from the group consisting of radiation and chemotherapy, wherein said method comprises: administering to an animal an effective amount of a non-immunosuppressive pyrrolidine carboxylate compound.

22. The method of claim 21 wherein the pyrrolidine carboxylate is a compound of the formula:

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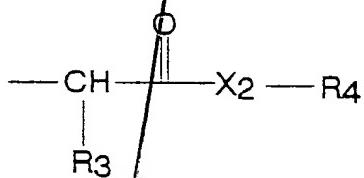
wherein

R₁ is selected from the group consisting of a C₁-C₆ straight or branched chain alkyl or alkenyl group optionally substituted with C₁-C₆ cycloalkyl, C₃ or C₅ cycloalkyl, C₅-C₆ cycloalkenyl, Ar₁, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C₁-C₄ alkyl, C₁-C₄ alkenyl, or hydroxy, where Ar₁ is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C¹-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino;

20 sulphur, methylene (CH_2), or H_2 ;

Y is selected from the group consisting of oxygen or NR₂, where R₂ is hydrogen or C¹-C₆ alkyl; and
Z is selected from the group consisting of C₂-C₆ straight

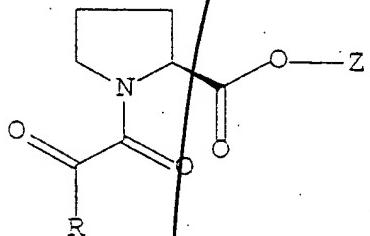
or branched chain alkyl or alkenyl,
wherein the alkyl chain is substituted in one or more
positions with Ar₁ as defined above, C₃-C₈ cycloalkyl, cycloalkyl
connected by a C₁-C₆ straight or unbranched alkyl or alkenyl
chain, and Ar₂ is selected from the group consisting of 2-
indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-
thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one
to three substituents which are independently selected from the
group consisting of hydrogen, halo, hydroxyl, nitro,
trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-
C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino; Z
may also be the fragment:



wherein

- R₃ is a C₁-C₉ straight or branched alkyl #₁-C₈ optionally substituted with C₃-C₈ cycloalkyl, or Ar₁ as defined above, and unsubstituted Ar₁;
- X₂ is O or NR₅, where R₅ is selected from the group consisting of hydrogen, C₁-C₆ straight or branched alkyl and alkenyl;
- R₄ is selected from the group consisting of phenyl, benzyl, C₁-C₅ straight or branched alkyl or alkenyl, and C₁-C₅ straight or branched alkyl or alkenyl substituted with phenyl; or pharmaceutically acceptable salts or hydrates thereof.

23. The method of claim 21 wherein, the pyrrolidine carboxylate is a compound of the formula:



II

wherein

R₁ is a C₁-C₆ straight or branched chain alkyl or alkenyl group optionally substituted with C₁-C₆ cycloalkyl, C₃ or C₅ cycloalkyl, C₃-C₆ cycloalkenyl, or Ar₁, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C₁-C₄ alkyl, C₁-C₄ alkenyl, or hydroxy, and where Ar₁ is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino;

Z is a C₂-C₆ straight or branched chain alkyl or alkenyl, wherein the alkyl chain is substituted in one or more positions with Ar₁ as defined above, C₁-C₆ cycloalkyl, cycloalkyl connected by a C₁-C₆ straight or unbranched alkyl or alkenyl chain, or Ar₂, where Ar₂ is selected

AS

from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro trifluoromethyl, C₁-C₆ straight or branched alkyl or alkenyl, C₁-C₄ alkoxy or C₁-C₄ alkenyloxy, phenoxy, benzyloxy, and amino; or pharmaceutically acceptable salts or hydrates thereof.

24. The method of claim 21 wherein the pyrrolidine carboxylate compound is selected from the group consisting of:

3-phenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-propyl(2S)-1-(3,3,dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

(1R)-1,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-

dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-furanyl])ethyl-2-pyrrolidinecarboxylate,

5 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thienyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thiazolyl])ethyl-2-pyrrolidinecarboxylate,

AS 10 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2,phenyl)ethyl-2-pyrrolidinecarboxylate,

10 3-(2,5-dimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

15 3-(2,5-dimethoxyphenyl)-1-prop-2-(E)-enyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

20 2-(3,4,5-trimethoxyphenyl)-1-ethyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

25 3-(3-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

20 3-(4-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

25 3-phenyl-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-

dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

5 3,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

AS 3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate;

3-(3-Pyridyl)-1-propyl (2S)-N-([2-thienyl]glyoxyl)pyrrolidinecarboxylate;

10 3,3-Diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxobutyl)-2-pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-cyclohexylglyoxyl-2-pyrrolidinecarboxylate,

15 3,3-Diphenyl-1-propyl (2S)-1-(2-thienyl)glyoxyl-2-pyrrolidinecarboxylate, and pharmaceutically acceptable salts, hydrates, and mixtures thereof.

ADAG